

Solve for  $x$ .

23.  $\log_7 x = \log_7 4 + \log_7 3 - \log_7 2$  \_\_\_\_\_

24.  $\log_3 x = 4 \log_3 2 + \log_3 5 - \log_3 4$  \_\_\_\_\_

25.  $\log_5 x = \frac{1}{2} \log_5 9 + \log_5 (x - 1)$  \_\_\_\_\_

26.  $\log_6 (x - 4) - \log_6 3 = \log_6 2$  \_\_\_\_\_

27.  $\log_7 3x^2 = 2 \log_7 24 - \log_7 3$  \_\_\_\_\_

28.  $2 \log_m (x + 1) - \log_m 4 = 0$  \_\_\_\_\_

Solve each equation.

33.  $\log_a x = 2 \log_a 3 + \log_a 5$

34.  $\log_a x = \frac{3}{2} \log_a 9 + \log_a 2$

35.  $\log_b (x + 3) = \log_b 8 - \log_b 2$

36.  $\log_b (x^2 + 7) = \frac{2}{3} \log_b 64$

37.  $\log_a x - \log_a (x - 5) = \log_a 6$

38.  $\log_a (3x + 5) - \log_a (x - 5) = \log_a 8$

39.  $\log_2 (x^2 - 9) = 4$

40.  $\log_3 (x + 2) + \log_3 6 = 3$

**Solve each equation.**

1)  $\log (n + 9) = \log 4n$

2)  $\log -5x = \log (10 - 3x)$

3)  $\log (-3m - 1) = \log (-4m - 6)$

4)  $\log a = \log (4a - 9)$

5)  $-4 \log_3 -9m = -4$

6)  $7 \log_9 (x + 8) = 7$

7)  $-8 + \log_9 (m + 1) = -8$

8)  $-2 \log_8 (a + 1) = -8$

9)  $\log_2 (a^2 - 6a) = \log_2 (10 + 3a)$

10)  $\log_{15} (x^2 + 13) = \log_{15} (-9x - 1)$

11)  $\log_{19} (x^2 + 17) = \log_{19} (8x + 2)$

12)  $\log_{12} (m^2 + 73) = \log_{12} (17m + 3)$

$$13) \log x - \log 6 = \log 15$$

$$14) \log 7 + \log x = 2$$

$$15) \log x + \log 2 = \log 2$$

$$16) \log x + \log 8 = 1$$

$$17) \log_4 (x^2 - 3) + \log_4 10 = 1$$

$$18) \log_7 2 + \log_7 (x - 5) = 2$$

$$19) \log_5 3 - \log_5 5x = 2$$

$$20) \log_3 (x^2 + 8) - \log_3 4 = 3$$

$$21) \ln (x + 7) + \ln (x + 3) = \ln 77$$

$$22) \ln (x + 1) - \ln (x - 1) = 3$$

$$23) \ln (x + 2) - \ln (x - 1) = 1$$

$$24) \ln (x + 3) - \ln (x + 2) = 5$$